



# Fact Sheet

DANTES Subject Standardized Tests

## ***PRINCIPLES OF STATISTICS***

### **TEST INFORMATION**

This test was developed to enable schools to award credit to students for knowledge equivalent to that which is learned by students taking the course. The school may choose to award college credit to the student based on the achievement of a passing score. The passing score for each examination is determined by the school based on recommendations from the American Council on Education (ACE). This minimum credit-awarding score is equal to the mean score of students in the norming sample who received a grade of C in the course. Some schools set their own standards for awarding credit and may require a higher score than the ACE recommendation. Students should obtain this information from the institution where they expect to receive credit.

### **CONTENT**

The test will cover all of the material that is usually taught in an introductory statistics course. The mathematical prerequisite for the test is high school algebra. Of particular importance are such topics as the algebraic and geometric aspects of linear equations, interpretations of certain curves and areas bounded by them, and simple inequalities. The questions in the examination will test the students' understanding of the various topics of statistics, both qualitatively and quantitatively, and the ability to apply statistical methods to solve a variety of problems of a statistical nature.

The following topics commonly taught in courses on this subject are covered by this examination:

	<b>Approximate Percent</b>
1. Descriptive Statistics Histograms, averages, standard deviation, normal approximation for data, standard units, areas under the normal curve, quartiles, and percentiles	<b>20-30%</b>
2. Correlation and Regression Scatter diagrams, correlation coefficient, estimation and the line of best fit	<b>15-20%</b>
3. Probability Basic concepts, dependent and independent events, compatible and incompatible events, binomial formula, combinations and permutations	<b>20-25%</b>
4. Chance Models and Sampling The law of averages, expected values, standard error, normal approximation, confidence intervals, sample size, sample average and estimating accuracy of sample average	<b>15-20%</b>
5. Tests of Significance Null hypothesis, significance levels, comparing two samples, t-test and x2 test	<b>15-20%</b>

NOTE: A number of test questions could be cross listed, that is, fall into several categories.



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## SAMPLE QUESTIONS

Certain words, concepts, and symbols on this test are defined as follows:

average = arithmetic mean

correlation = linear correlation

SD = standard deviation

$$\text{Rms} = \text{root-mean-square} = \sqrt{\frac{\sum x^2}{n}}$$

area of a rectangle with adjacent edges  $a$  and  $b = a.b$

area of a triangle with base  $b$  and corresponding altitude  $h = \frac{1}{2}b.h$

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1. A 100 question multiple-choice test has 4 choices for each question. If a student selects all choices randomly, how many correct answers could the student expect?

(A) 4  
(B) 8  
(C) 25  
(D) 40

2. Each of the following statements is true for all probability curves for random variable  $x$  EXCEPT:

(A) The area under the curve is 1.  
(B) The highest point on the curve occurs at the average.  
(C) The curve does not cross the  $x$ -axis.  
(D) The probability that  $x$  is between  $a$  and  $b$  is equal to the area of the region bounded by the curve, the  $x$ -axis, and the lines  $x = a$  and  $x = b$ .

3. Which of the following could NOT be the value of a correlation coefficient?

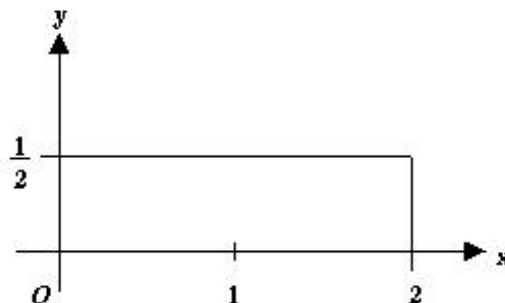
(A) -1  
(B) 0  
(C) 1  
(D) 2

4. The average and SD of a set of 50 scores are 30 and 7, respectively. If each of these scores is increased by 10, then which of the following is true for the new set of scores?

(A) The average is 60.  
(B) The average is 40.  
(C) The SD is 17.  
(D) The SD is 7.2.

5. A bag contains 15 marbles, of which 8 are red, 5 are blue, and 2 are white. Two marbles are drawn randomly from the bag one after the other, without replacement. What is the probability that both marbles are red?

(A)  $4/15$   
(B)  $64/225$   
(C)  $32/105$   
(D)  $8/15$



6. If the figure above is a probability histogram, what is the probability that  $x \geq 1/2$ ?

(A)  $1/4$   
(B)  $1/2$   
(C)  $5/8$   
(D)  $3/4$

7. Which of the following pairs of parameters is sufficient to define a specific normal curve?

(A) The average and the standard deviation  
(B) The range and the standard deviation  
(C) The average and the Chi-Square ( $\chi^2$ )-value  
(D) The standard deviation and the Chi-Square ( $\chi^2$ )-value

8. A random sample of 100 values of  $x$  is taken from a distribution whose SD is  $k$ . What will be the approximate value of the standard error of the average of  $x$  ?
- (A)  $0.01k$   
 (B)  $0.1k$   
 (C)  $0.5k$   
 (D)  $k$
9. If  $H_0$  is the null hypothesis and  $P$  is the observed (computed) significance level, then
- (A) “small” values of  $P$  are evidence for  $H_0$   
 (B) “small” values of  $P$  are evidence against  $H_0$   
 (C) “small” values of  $P$  give no information for or against  $H_0$   
 (D) a rejected  $H_0$  “ corresponds to a negative value of  $P$ ”
10. A balanced die is rolled 4 times. What is the probability that a six will NOT appear on any roll?
- (A)  $(5/6)^4$   
 (B)  $6 (5/6)^4$   
 (C)  $5/6$   
 (D)  $1 - (1/6)^4$

## STUDYING FOR THE EXAMINATION

The following is a list of reference publications that were being used as textbooks in college courses of the same or similar title at the time the test was developed. Appropriate textbooks for study are not limited to those listed below. If you wish to obtain study resources to prepare for the examination, you may reference either the current edition of the following titles **or** textbooks currently used at a local college or university for the same class title. It is recommended that you reference **more than one textbook** on the topics outlined in this fact sheet. You should **begin by checking textbook content against the content outline** included on the front page of this Fact Sheet **before** selecting textbooks that cover the test content from which to study. Textbooks may be found at the campus bookstore of a local college or university offering a course on the subject.

Sources for study material suggested but not limited to the following:

Freedman, David, Pisani, Robert and Purves, Roger. *Statistics*. Norton and Company, current edition.

McCabe, George P. and Moore, David S. *Introduction to the Practice of Statistics*. W.H. Freeman, current edition.

Moore, David S. *Against All Odds Study Guide*. W.H. Freeman, current edition.

Adler, Henry L. and Roessler, Edward R. *Introduction to Probability and Statistics*. W.H. Freeman, current edition.

Bain and Englehardt. *Introduction to Probability and Mathematical Statistics*. Duxbury Press, PWS Kent Publishers, current edition.

Berensen, Mark L. and Levine, David M. *Basic Business Statistics: Concepts and Applications*. Prentice-Hall, current edition.

Hoel, Paul G. *Elementary Statistics*. Wiley, current edition.

Mendenhall, William. *Introduction to Probability and Statistics*. Duxbury Press, PWS Kent Publishers, current edition.

Mendenhall, William and Sinchich, Terry. *Statistics for Engineering and Computer Science*. Deller Publishers, current edition.

Neter, John, Wasserman, William and Whitmore, G.A. *Applied Statistics*. Allyn, Bacon, current edition.

Smith, G. *Statistical Reasoning*. Allyn, Bacon, current edition.

Strait, Peggy T. *A First Course in Probability and Statistics with Applications*. Harcourt, current edition.

Current textbook used by a local college or university for a course on the subject.

## CREDIT RECOMMENDATIONS

The Center for Adult Learning and Educational Credentials for the American Council on Education (ACE) has reviewed and evaluated the DSST examination development process. The American Council on Education has made the following recommendations:

Area or Course	
Equivalent:	Principles of Statistics
Level:	Lower level baccalaureate
Amount of Credit:	Three (3) semester hours
Source:	ACE Commission on Educational Credit and Credentials

Colleges and universities that would like additional information about the national norming, or assistance in local norming or score validation studies should write to: DSST Program, Mail Stop 11-P, The Chauncey Group International, 664 Rosedale Road, Princeton, New Jersey 08540.

It is advisable that schools develop a consistent policy about awarding credit based on scores from this test and that the policy be reviewed periodically. The Chauncey Group will be happy to help schools in this effort.

Correct Responses to sample questions: 1.C; 2.B; 3.D; 4.B; 5.A; 6.D; 7.A; 8.B; 9.B; 10.A

